Weight Control and Nutrition Education Programs in Occupational Settings

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MALNUTRITION HAS BECOME a major health problem in the United States. Both underconsumption and overconsumption of food contribute significantly to death and disease. Coronary heart disease, hypertension, obesity, diabetes, and other conditions related to food account for well over half of all deaths each year.

The U.S. diet has become overladen with saturated fat, cholesterol, sugar, and salt and deficient in complex carbohydrates, such as grains, vegetables, and fruits.

Because of changes in eating habits since the turn of the century, several authoritative bodies, including the Council on Food and Nutrition of the American Medical Association and the Food and Nutrition Board of the National Academy of Sciences (*1*) have recommended that persons at risk of developing heart disease follow a diet aimed at maintaining ideal body weight and lowering plasma cholesterol. The Inter-Society Commission for Heart Disease Resources (*2*) has proposed that the entire American population follow these recommendations. The Senate's Select Committee on Nutrition and Human Needs has suggested specific dietary goals for the American public (*3*):

1. To avoid overweight, consume only as much energy (calories) as is expended; if overweight, decrease energy intake and increase energy expenditure.
2. Increase the consumption of complex carbohydrates and "naturally occurring" sugars from about 28 percent of energy intake to about 48 percent of energy intake.
3. Reduce the consumption of refined and processed sugars by about 45 percent to account for about 10 percent of total energy intake.
4. Reduce overall fat consumption from approximately 40 percent to about 30 percent of energy intake.
5. Reduce saturated fat consumption to account for about 10 percent of total energy intake; and balance that with poly-unsaturated and mono-unsaturated fats, which each should account for about 10 percent of energy intake.
6. Reduce cholesterol consumption to about 300 mg a day.
7. Limit the intake of sodium by reducing the intake of salt to about 5 grams a day.

If followed, these suggestions would have Americans eating less red meat, eggs, sugar, salt, and foods high in saturated fat, and more whole grains, vegetables, and fruits.

The worksite offers a unique opportunity for implementing suggestions to improve the U.S. diet. Unfortunately, research has consistently shown that good advice on food consumption is rarely followed. Programs for weight loss, for example, have been notoriously ineffec-

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tive (*4*). It has been said that the chances of an obese person losing 40 pounds and maintaining that loss for 5 years are about the same as those of a person recovering from cancer of the stomach. Combinations of low calorie diets, exercises, and medication have been unsuccessful in the great majority of cases. Although some people may lose a few pounds while actively following a treatment program, none of these three treatment techniques has been shown to result in significant long-term success for most obese persons.

In the last 10 years, however, a new strategy has been aimed specifically at teaching people not only what to eat but how best to adhere to a recommended diet. A number of techniques directed at behavior change have shown some recent success in altering habits that traditionally have been extremely difficult to reform. In this paper we will review both the specific techniques and the programs in which they have been used, especially programs that have been carried out at the worksite, as well as programs for obese persons and those aimed at changing diet in general.

Behavioral Techniques

The basic premise underlying behavioral treatment programs is that dietary changes require substantial changes in eating habits. Poor diet, including underconsumption and overconsumption of foods, is seen as stemming primarily from environmental sources, not from an underlying pathological condition. The goal of these programs is to teach people how to achieve self-control over their eating behavior. Treatment begins with a detailed investigation of a person's dietary behavior through self-monitoring; the person writes down all important events that occur before the ingestion of food and tend to elicit eating, the actual act of eating, and the events that occur after eating which seem to maintain the intake of certain foods. The person is then taught specific techniques, called stimulus control techniques, to help change the events that occur before eating; the act of eating, such as slowing down consumption; and events after eating (contingency management techniques). Most behavioral programs use all of these techniques, and each has been investigated experimentally.

Self-monitoring. Essentially all behaviorally oriented treatment programs for dietary change use some form of self-monitoring that consists of two steps: observation of one's dietary behaviors and recording those observations. The person is asked to be aware of and write down his dietary behavior during the period that he is receiving treatment. He records in a notebook all food and drink ingested, including the amounts consumed, method of preparation, the time of day the food was taken, the place, other people present, feelings just before eating, and other important information. Calories or food exchanges may also be recorded. All information is written down immediately after consuming food or drink. The chart is an example of a daily dietary record.

Self-monitoring is useful: first, it gives the individual and the person working with him a record of his dietary lifestyle. It therefore will help clarify what lifestyle changes are needed. Second, the act of writing down food intake seems to have a positive effect on the diet itself, at least at the beginning of a program. A person may choose not to eat a super-rich dessert because he does not want others to see his failure or lack of will power.

The technique has been investigated experimentally a number of times (*5–14*). Most group leaders feel that self-monitoring is important because a record of what one is doing is needed. Some also find that it is helpful in changing behavior per se, although the long-term evidence is not strong. Nonetheless, it has become a necessary component of treatment, although participants oftentimes find it inconvenient to fill out the forms, and the task seems boring and monotonous. Once a person keeps such a record for about 3 weeks, complaints about it tend to lessen. Most seem to become aware of the importance of this dietary record to themselves and their treatment.

Body weight is self-monitored in many programs. Each person is given a graph (body weight comprises the vertical scale and days the horizontal one) and asked to post it on the wall above the scale. The person is asked to weigh himself on a regular schedule and record it, an act that makes the person aware each day exactly how he is doing. Individuals may also be asked to monitor their energy expenditures.

Stimulus control techniques. After monitoring himself for a week or two, a person will begin to see patterns in his dietary lifestyle. The physician, dietitian, or other helping person will also see cues that precede eating. For example, he may be eating two doughnuts each morning with a cup of coffee because he stops off on the way to work and brings in a dozen for himself and co-workers. Vending machines stocked with high-fat sandwiches or sugar-laden junk foods may be near the assembly line or the employee's desk. In the evening, the Monday night football game or movie of the week may lead to beer drinking and snacking. Bringing

office work home may elicit consumption of certain foods in the evening. Reading office reports or other material oftentimes tends to be tied to snacking. Stimulus control techniques aid the person by helping him rearrange his environment to reduce the chances of inappropriate eating. For example, if it is difficult to drive by the doughnut shop without stopping, the employee might select another route to work in the morning. Vending machines can be stocked with wholesome foods or moved away from the work area. If television watching or reading office reports at home is frequently associated with inappropriate snacking, turning off the set or staying away from the reports while eating may help.

Many people eat in several places at work and at home. To decrease the cues that lead to eating, they may be asked to eat only at one place at work, such as the company cafeteria, and at home, usually sitting at the dining table. Eating is scheduled only at certain regular times both at work and home. New cues for eating may also be arranged. For example, eating might be allowed only while sitting in a special chair in the company cafeteria or only in the presence of a certain tablecloth, or even from a specially colored plate. The same techniques can also be employed at home. Their purpose is to help break poor dietary habits by restructuring, at least for a while, the employee's worksite and home environments.

Figure 1. Food record

Name Tom Smith

I.D. No. _____ Date Dec. 4, 1978

Write *ONE* food on each line.

7 Meat ||||
2 Dairy ||
6 Fat ||||
4 Fruit ||||
7 Bread ||||

Time	Place	Amount	Food—How Prepared	Food Exch.
7:30a	kitchen	4 oz	orange juice	1 Frt
	table	3/4 cup	cornflakes with	1 Brd
		1 cup	skim milk and sugar substitute	1 Dr
		1 slice	toast	1 Brd
		1 tsp	margarine	1 Fat
10:30a	lounge	1	fresh peach	1 Frt
12:00p	company	3 oz	baked chicken (no skin)	3 Mt
	cafeteria	1/2 cup	rice	1 Brd
		1/2 cup	green beans with	free
		1/2 tsp	margarine	1/2 Fat
		1 cup	tossed salad with	free
			lemon juice	free
		1	hot roll	1 Brd
		1 tsp	margarine	1 Fat
		1/2 cup	fresh fruit compote	1 Frt
3:00p	vending	1 cup	plain yogurt (low fat)	1 Dr+
	machine			1 Fat
7:00p	dining	4 oz	broiled steak (no fat)	4 Mt
	room	1 med	baked potato with chives	1 Brd
			broccoli with	free
		1/2 tsp	margarine	1/2 Fat
		2 cup	fresh vegetable salad with	free
		4 tsp	French dressing	2 Fat
		1 slice	French bread	1 Brd
		1 cup	fresh strawberries	1 Frt

These stimulus control techniques are helpful components of dietary treatment programs. Of course, to make the best use of these principles, the individual and the person helping him must be creative in designing and individualizing the most appropriate procedures for the worksite and home.

Slowing the act of eating. It is oftentimes helpful for an overweight person to eat slowly. By doing so, the person may better experience the physiological effects of satiety. Since it takes approximately 20 minutes for satiety to occur, the fast eater can ingest a large number of calories without feeling satiated. There are a number of techniques aimed at teaching a person to slow down. He is told to take a bite of food, lay down his fork and knife, put his hands in his lap, and chew slowly before swallowing. For foods not requiring utensils, such as a lunchtime sandwich, the procedure is to lift the sandwich, take a bite, put the sandwich down, hands in lap, chew throughly, and swallow. A really fast eater will have great difficulty following such a technique because he forgets after a few bites. To help remind him, he might place a little sign on a 3- by 5-inch card, next to his plate "Lay down utensils between bites" or "Slow down." Eating slowly often makes the experience more pleasurable and the food taste better. The person may also find himself eating less. When an employee is given only a half hour for lunch, he should spend the 30 minutes eating, not shopping, reading the newspaper, running errands, and eating. Restructuring one's time is obviously a crucial element in behavioral treatment.

Contingency management techniques. A person needs to be rewarded for changing his diet, and reward systems are built into many programs. For example, an employee may receive 5 points or tokens a day for keeping food records, eating only in the cafeteria at appropriate intervals, and eating all foods slowly. When 25 points are earned, the person can reward himself with something special (not food). He is also praised for his good work.

Assignments are usually written as a formal "contract" that the employee signs. Contracts make explicit what a person is expected to do, and they may serve as a motivator to keep him in the program. They are especially useful in weight control programs.

Weight Loss Programs

Published articles on the behavioral treatment of obesity have been reviewed by a number of authors (*15–27*). To date, many of the behavioral programs have been conducted in colleges and universities, usually for a group of mildly overweight undergraduate females or people from the surrounding community. These studies have generally shown relatively modest weight losses for the participants. To illustrate the results, we combined the data from 11 published studies (*8,9,28–36*), selected because they present pre-, post-, and followup data. A total of 501 persons received some form of behavior modification, 157 received nonbehavioral treatment, usually called "supportive counseling," and 74 persons served as no treatment controls.

The weighted means for the 501 persons who received behavior modification training were 174 pounds pretreatment, 167 pounds after 8 weeks of treatment, and 167 pounds after an 18-week followup. The 157 people who received some other form of treatment had an average pretreatment weight of 172 pounds, a weight of 170 pounds after 12 weeks of treatment, and a weight of 174 pounds after a 28-week followup. The 74 no treatment control persons had a weighted mean of 159 pounds, 67 had weighted means of 159 pounds after 9 weeks and 156 pounds (for 42 persons) after 4 weeks. Based on these results, which include a representative sampling of the experimental literature, it appears that with mildly overweight populations, behavioral treatment shows greater post-treatment weight losses than groups not treated behaviorally.

Recently, a number of studies have been carried out with chronically obese individuals. The two largest studies reported to date have been conducted at the Medical University of South Carolina (*37*) and at the Stanford University Eating Disorders Clinic (*38*).

Average weight of the 165 patients at the start of the 18-month treatment at the Medical University of South Carolina was 185 pounds; they had been overweight for an average of 20 years. At post-treatment, 71 patients had lost less than 11 pounds, 46 had lost between 11 and 20 pounds, 38 more than 20 pounds, and 10 more than 40 pounds. One year later, 56 of these patients were located; 39 had regained their losses, 6 had maintained their original losses, and 11 had continued to lose weight, an average of 9 pounds.

The Stanford researchers reported data on the first 125 clients treated at the clinic. Pretreatment average weights were 265 pounds for 23 males and 206 pounds for 102 females. At post-treatment, 65 clients had lost less than 11 pounds (16 of these had gained weight), 39 had lost between 11 and 20 pounds, 14 between 21 and 30 pounds, 3 between 31 and 40 pounds, and 4 more than 40 pounds. Average weight loss was about 11 pounds. One-year post-treatment data were also reported for 88 clients. Their post-treatment weight loss was an average of 13 pounds, which was maintained at the followup.

The few weight control programs in industry are part of general exercise programs. The weight loss effort may consist of a lecture or two by the company nurse. Some firms have contracted with organizations such as the local health department or a group like the American Diabetes Association or a commercial venture such as Weight Watchers. A detailed example of a contract with an outside group is presented subsequently. Among the few firms that have tried weight loss programs for their employees are the Ford Motor Company, General Foods, and Kimberly-Clark.

Ford Motor Company, Dearborn, Mich. As part of its comprehensive Cardiovascular Risk Intervention Program, Ford includes weight control and has developed a program specifically for overweight employees. An interested employee first volunteers to undergo standard screening tests to determine the presence of cardiovascular risk factors such as elevated cholesterol, blood pressure, or obesity. This information is combined with data on the family history of heart disease and on smoking and exercise habits. If these data warrant further attention, the employee is invited to participate in a risk intervention group. Individual consultation is also available. Only mild to moderately overweight employees are treated. Anyone needing to lose more than 30 pounds is referred to outside resources. The program does not have a full-time nutritionist (B. G. Ware, Corporate Coordinator, Health Education Programs, Ford Motor Company, described the Ford program in a letter to Foreyt dated October 30, 1978).

General Foods, White Plains, N.Y. A pilot program was tried in 1977 with 12 overweight employees, 6 men and 6 women, employed by General Foods. All signed a contract, putting up $100 which would be returned to them if they attended classes faithfully; the money would be sent to their favorite charity if they failed to attend. At 19 meetings, both individual and group sessions, such topics as good nutrition, exercise, risk factors, and behavior modification techniques were presented. At post-treatment, the 6 women had

lost an average of 15 pounds and the 6 men an average of 18 pounds. A followup 6 months later revealed that 9 of the 12 had regained their losses. Those who kept the weight off were in an exercise program. Because of the great investment of time in these 12 employees, the program was not cost effective.

More recently, General Foods offered during the lunch hour a series of 5 half-hour lectures on weight management. A physician, a nutritionist, and the company's associate manager of health fitness talked about behavior modification and risk factors, diet choices, energy expenditure, and fad diets, and a film on weight management was presented. A total of 90 employees—17 men and 73 women—attended the first lecture. Attendance dropped at subsequent lectures but all were reasonably well attended. The series will be repeated at another plant. (M. Fein, Health Fitness Coordinator, General Foods, described the program to Foreyt in a telephone call on November 9, 1978.)

Kimberly-Clark Corporation, Neenah, Wis. Weight control is one part of the Health Management Program of the Kimberly-Clark Corporation. Employees at the corporate offices and facilities near Neenah are invited to get a company-paid evaluation of their health risks, using an extensive 40-page medical history; laboratory tests including hemoglobin, blood sugar, cholesterol, triglycerides, liver function, urinalysis, chest X-ray, breathing, skinfold thickness, body density, electrocardiogram, hearing, vision, blood pressure, and temperature; complete physical examination; and treadmill test. They then receive individualized health prescriptions that might include counseling and seminars on obesity. The company has spent $2.5 million to build an office for testing and a large physical fitness facility that includes a swimming pool, 100-meter track, exercise equipment, sauna, whirlpool, showers, and lockers.

The screening is offered annually to all employees. Physical examinations are given every 2 years for employees 40 and older and every 3 years for those under 40. More than 60 percent of Kimberly-Clark's 2,100 employees in Neenah have participated in the program. (R. E. Dedmon, M.D., Staff Vice President, Medical Affairs, Kimberly-Clark, described this program to Foreyt in a letter dated November 7, 1978.)

Division of Federal Employee Occupational Health, Public Health Service. The Division of Federal Employee Occupational Health recently held a 3-day training program in "Nutrition and Weight Reduction" to provide staff nurses with enough skills and knowledge to plan and implement weight reduction programs in the occupational health setting. Each class was limited to 12 participants.

Topics covered during three sessions were principles of nutrition, psychological aspects of obesity, application of behavior modification to weight control, small-group dynamics, the principles of learning, and the planning and administration of a weight reduction program in the occupational health setting. A nutritionist from the American Heart Association lectured on principles of nutrition and discussed the harmful effects of fad diets and the calculation of caloric requirements. A psychiatric social worker spoke about behavior modification and the techniques she employs in her private practice. Division staff—the health education assistant, Health Education Branch, and the nurse trainer and deputy chief, Clinical Services Branch, covered the other topics.

This training program has been held 3 times for a total of 34 participants. Nine nurses in the first two programs have started weight reduction groups. These groups range in size from 3 to 10 employees who meet weekly for 8 to 12 one-hour sessions.

Following formal treatment, maintenance meetings are usually held every 2 to 4 weeks. Weight losses generally have been ½ to 2 pounds a week. The program is currently being evaluated by the Division's staff, who will decide whether to expand it eventually to all 148 health units nationwide, for Federal employees. (Letter to Foreyt of October 26, 1978, from A. B. Ederma, MD, Director, Division of Federal Employee Occupational Health, Health Services Administration, Public Health Service.)

U.S. Air Force Hospital, Tinker Air Force Base, Okla. An unusual nonvoluntary behavioral treatment program is being conducted at Tinker Air Force Base for personnel who meet the Air Force's criteria of obesity. Active duty personnel who have been identified at squadron level as being obese are referred to the treatment clinic at the hospital. Participants attend weekly classes, and progress reports are sent monthly to each squadron's weight control monitor. Participants are dropped from the program when they achieve their goal. Maintenance sessions are offered to those who wish to attend. Average weight losses for these groups have ranged from 6 to 10 pounds, depending on the length of treatment (1 to 4 months).

According to its organizers, the program has met with enthusiastic endorsement by unit commanders,

as well as the patients themselves, and has lent itself to easy adaptation to the military population (*39*).

Union-sponsored weight loss program. In a conversation on June 2, 1978, Dr. Albert J. Stunkard, Department of Psychiatry, University of Pennsylvania School of Medicine, outlined the weight control program he is carrying out with members of the United Store Workers Union. They work at Gimbel's 34th Street store in New York City, next door to the union's headquarters. Interested overweight union members have been randomly assigned to various treatment or control groups. Depending on their group, employees may receive weekly or daily behavioral treatment from professional or union leaders at the headquarters or in a traditional medical setting. This study is the first rigorous experimental investigation of behavioral weight control programs at the worksite. Its results may indicate the potential impact that the collaboration of behavioral scientists with union leaders can have on the health of the members.

Gold King Program

Gold King, an oil production and drilling company in Houston, Tex., requested that the Methodist Hospital Weight Control Clinic conduct two series of weight control classes for its employees. The company paid $100 for each of the 22 overweight employees participating. Both series were conducted by a dietitian who was familiar with behavior modification techniques and nutrition information. The company provided a conference room and equipment for showing slides. Employees were allowed time from work to attend eight 1-hour classes. The lesson plans for the eight classes follow.

GOLD KING CLASSES

1. Each participant was measured—weight, height, triceps skinfold, and a side-profile photograph. A diet history and behavioral questionnaire were completed. Each employee signed an informed-consent statement. The lecture consisted of an introduction to behavior modification techniques, including self-monitoring, stimulus control, and contingency management. The HELP Your Heart Eating Plan for Weight Control was also introduced. It is a well-balanced eating plan, adequate in vitamins and minerals and low in cholesterol and saturated fat, designed to lower cholesterol and triglycerides by about 10 percent in normal persons. Use of the behavior modification techniques and following the eating plan could result in a weight loss of 1 to 2 lbs per week. It was recommended that participants purchase food scales, measuring cups, and spoons for weighing and measuring food.

2. "Control of Eating Environment" by confining eating to one place in the home, making eating a singular activity, and leaving a little food on the plate at each meal during the next week as a means of demonstrating self-control was discussed in detail. The nutrition lesson consisted of a discussion of the food groups along with servings allowed from each group. The dietitian also designated a caloric level for each participant according to the food intake and diet history each person had filled out the previous week.

3. During "Control When Eating Away from Home," participants were taught how to choose appropriate restaurants and given guidelines for following the HELP Your Heart Eating Plan. They role-played some ticklish situations, such as what to do when a friend serves a rich dish not on the diet, or when the foods served at a banquet do not fit with the new eating plan. The nutrition lesson consisted of selecting the best choices on the menus of various local restaurants.

4. For the behavior modification lesson, "Control and Change of Food Consumption," participants were encouraged to serve their allowed portion only once, use a slightly smaller plate, and slow the rate of eating so that the meal lasts at least 20 minutes. Formal weight control contracts were distributed. The nutrition lesson was devoted to dairy products; participants tasted various low fat cheeses available in local supermarkets.

5. The behavior modification lesson was a continuation of stimulus control techniques, "Control of Eating Cues." These included storing food out of sight and not snacking while preparing meals. Jacobson's progressive relaxation technique was also introduced, starting with the relaxation of muscles in the hands, arms, neck, shoulders, and head. This technique was added to aid those who overeat because of stress, tension, and anxiety.

6. The behavior modification techniques consisted of a continuation of how to relax including the imagery of relaxing. The nutrition education lesson was devoted to the selection of low-fat meat, fish, and poultry. Participants sampled homemade lean beef sausage.

7. The behavior modification lesson, "Control of Obtaining Food," included making a menu plan and a grocery shopping list, avoiding eating in the car, and rules for disposing of food. Relaxation was reviewed. The nutrition lesson presented information on the bread and cereal group, preparation of foods, portion sizes, and label reading.

8. The behavior modification lesson centered around maintaining ideal body weight; a maintenance diet was also discussed.

Results of these classes for 22 participants are shown in table 1. Within-group differences were statistically significant for both series—$t(8)=3.69$, $P<.01$ and $t(12)=5.44$, $P<.01$ respectively.

These classes illustrate one approach that a concerned company developed for its employees. Continued contact through periodic booster classes may be necessary to insure continuing losses to reach ideal body weights. Followup data will help to determine whether such interventions are lasting.

Although small in scope, such programs may have a decided impact on employee morale and health. The cost effectiveness of such approaches, however, must await the collection of long-term results.

Nutrition Education Program in Industry

Nutrition education programs in industry are rarer than

weight control programs. Boeing, Land O'Lakes, and Campbell Soup Company took three different approaches to educate their employees in the principles of good nutrition.

Boeing Company, Seattle, Wash. The Boeing Company has contracted with the ARA Food Service Company to provide a health and nutrition program for its employees. The program has three objectives:

1. Serving foods low in fat, calories, and cholesterol as an alternative to the regular food available at each Boeing food service facility,

2. Supplying vending machines with nutritious snacks such as raisins, fresh fruit, nuts, and seeds, and

3. Providing nutrition education articles in the Boeing newspaper.

The program is identified in the 85 cafeteria and food service areas by a 3- by 5-foot rainbow sign with the slogan, "Eat Better and Feel Better." Although the program was initiated only in April 1978 it accounts for 10 to 12 percent of the per capita food sales (approximately 45,000 people eat at the company's food service facilities daily). The Boeing program was described by M. C. McKinley, a registered dietitian with ARA Food Service Company, in a telephone conversation with Ms. Scott on October 31, 1978.

Land O'Lakes Company, Minneapolis, Minn. Land O'Lakes Company has developed a program using computers to create awareness and interest in diet and exercise. Periodically, computer terminals are made available to employees so that they can talk to the computers. Interested persons keep a 3-day record of foods eaten and energy expended. The computer responds with feedback on the employee's food intake and exercise behavior. Each employee is also asked about his weight and activities and given information by the computer about his risk of heart disease. This program

Table 1. Results of an 8-week behavioral treatment program at a worksite

Group and participant Nos.	Sex	Age (years)	Height (inches)	Weight in pounds		
				Pretreatment	Posttreatment	Change
Group 1 (N=9):						
1	F	24	65	204	198	− 6
2	F	49	64	126	115	−11
3	F	23	66	135	123	−12
4	F	28	64	136	138	+ 2
5	F	26	64	120	116	− 4
6	M	42	67	172	163	− 9
7	F	26	64	154	154	0
8	M	44	71	190	177	−13
9	F	57	64	131	126	− 5
Mean		35.4		152	146	[1]− 6
S.D.		12.7		30.2	29.3	5.1
Group 2 (N=13):						
10	M	52	72	207	202	− 5
11	M	38	70	182	169	−13
12	F	23	62	134	125	− 9
13	M	35	69	207	190	−17
14	M	43	73	212	202	−10
15	F	28	65	115	112	− 3
16	F	29	64	126	124	− 2
17	F	32	62	104	97	− 7
18	F	31	68	163	158	− 5
19	F	30	64	127	125	− 2
20	M	36	73	268	266	− 2
21	M	47	69	189	183	− 6
22	M	37	72	174	164	−10
Mean		35.5		170	163	[1]− 7
S.D.		8.1		47.6	46.7	4.6

[1] $P < .01$

has not yet been evaluated. A. Stansfield, Consumer Affairs Director, Land O'Lakes, supplied the information on this program in a phone call to Ms. Scott on November 30, 1978.

Campbell Soup Company, Camden, N.J. The Campbell Soup Company has conducted a large-scale study of the prevalence patterns of lipoprotein and serum lipid abnormalities, the relationship of these lipid factors to the development of atherosclerosis, and the effects of changing some of these factors. Employees are given a blood test, and a family history and other measurements are recorded. About 35 percent of the employees screened have elevated serum lipids. Employees are offered information about a prudent diet, low in fat, cholesterol, and sugar along with pamphlets on good nutrition to help insure that individuals get an adequate intake of vitamins and minerals. Results suggest that about 50 percent of those receiving dietary information are following it after 1 year, and about 10 percent follow it adequately (*40*).

Evaluation of Industry Programs

To date, it has not been possible to evaluate the impact of the few programs being conducted at worksites. As more programs are started, however, it will become important to design them to permit evaluation. Weight control and nutrition programs need to take into account five major factors.

1. Cost effectiveness. With the emphasis upon controlling costs increasing, it is important that all costs—including personnel used, testing, time off from work to attend classes, and so forth—be compared with potential benefits, such as reduced disability, absenteeism, hospital and insurance premiums, reduced turnover, improved employee morale, and direct benefits of pounds lost or cholesterol lowered.

2. Attrition. To evaluate a program properly, data on employees who drop out are needed.

3. Followup. Results of treatment are rarely reported beyond 1 year after a program is completed. Long-range data are especially important to determine if continued weight loss occurs or if goal weight is maintained.

4. Confounding variables. Because there may be uncontrolled or poorly controlled variables, it is especially difficult to attribute changes in employees' weight or diet to the techniques employed. Employee and group leader expectations, demand characteristics, and other nonspecific variables make interpretation of results vulnerable to error. It is important to design programs carefully in order to avoid as many problems as possible in the work setting.

5. Analysis of results. Weight control and nutrition education programs need to report pretreatment, posttreatment, and followup data on each participant. Reporting only average results often obscures true data and may distort the interpretation.

Recommendations

A number of diets low in calories, saturated fat, and cholesterol are available for use in weight control and nutrition education programs. An example of such a diet is the HELP Your Heart Eating Plan (*41*). The calorie level can be adjusted to allow a person to lose 1 to 2 pounds per week or maintain present body weight. In this diet, 40 percent of the calories are in carbohydrates, 20 percent in proteins, and 35 percent in fats, with 10 percent of the fats polyunsaturated, 10 percent saturated, and the remainder monounsaturated. It contains about 300 mg of cholesterol daily. Table 2 gives the details of this eating plan.

Basic research on the treatment of obesity and the development of good dietary habits has also been carried out, primarily in colleges, universities, and health clinics. Results of these studies suggest that behavior modification techniques are superior to other forms of treatment in helping mildly to moderately overweight persons adhere to dietary regimens and thereby achieve weight losses. These losses, although modest, are maintained for at least 1 year after the formal treatment ends (*38*).

The potential for applying these programs at worksites within industry, government, and the Armed Forces is enormous. The numbers to be reached are almost unlimited, and with careful planning, the programs could conceivably have powerful effects on the health of participants.

Interest today is shifting from curative to preventive programs, and the worksite offers a unique opportunity to provide both types of interventions. Periodic employee health screenings can identify those who are at highest risk for cardiovascular diseases, and programs might be made available to aid them. Those with elevated cholesterol, for example, might, under a physician's supervision, be offered classes in proper diet and the behavioral techniques for adhering to the diet.

Those who need help to lose weight might be offered similar intervention.

Essentially all dieters could use the same well-balanced, low fat, low cholesterol diet, adjusting the caloric levels to individual needs.

In addition to these "at risk" populations, companies might offer interested employees similarly structured preventive programs that could take the form of special lectures, classes, posters, or articles in company papers designed to teach good nutrition and to motivate employees to follow healthy eating plans. Foods low in calories, cholesterol, and saturated fat might be made available in a company's food service facilities and vending machines. These foods could be clearly identified.

We studied the effects of offering choices of low cholesterol dishes in a local Houston restaurant, with a special menu identifying these foods. The calorie content of each low cholesterol item was printed next to it. Over the year that we measured the sales of these foods, we found that the menu appealed to a small but consistent number of customers. The restaurant administrators reported that the cost of printing the special menu was the only major expense incurred in this experiment. No additional manpower or time was required, and the ingredients of the dishes were among those routinely stocked. The restauranteurs were pleased with the menu and plan to offer it indefinitely (*42*).

As nutrition education and weight loss programs are implemented in industries, life and health insurance companies might help to collect information about their effectiveness as well as helping in the treatment by offering decreased insurance payments as incentives to encourage companies to design and offer programs and to employees to participate in them.

Conclusions

The potential for developing health promotion programs at the worksite has not yet been tapped. Nutrition education programs for weight reduction and attuned to cardiovascular risk factors related to diet offer particular promise because they can be put into practice so easily in company cafeterias. The combination of a prudent eating plan and the behavioral techniques which teach people how to adhere to such a diet have been developed and can be put into practice. As programs are developed, we hope that they will be designed so that their cost effectiveness can be evaluated.

Table 2. The HELP Your Heart Eating Plans

Food group	*Regular plan*	*Low calorie plan*
Vegetable oil	2 tablespoons daily safflower, corn, soybean, or cottonseed oil	1 tablespoon daily safflower oil
Soft tub margarine	2 tablespoons daily safflower, corn, or sunflower oil margarine	2 teaspoons daily safflower, corn, or sunflower oil margarine
Meat, fish, poultry	7 ounces daily	6-7 ounces daily
Skim dairy products (less than 1 percent butterfat)	unlimited, unless controlling calories	2 servings dairy products
Lowfat dairy products (1-2 percent butterfat)	2 servings daily	none recommended
Grain products and starchy vegetables	4 or more servings daily	4 servings daily
Vegetables, nonstarchy	unlimited	unlimited
Fruits	4 or more servings daily	4 servings daily

MEAT, FISH, POULTRY, EGGS
The leanest cuts of meat are the lowest in saturated fat and calories and are allowed on the HELP Your Heart Eating Plan. Fish and poultry are especially low in fat and should be selected more frequently than beef, pork, and lamb. Egg yolks are the most concentrated source of cholesterol and are limited to 2 per week. Egg substitutes and egg whites can be used freely since they contain no cholesterol.

DAIRY PRODUCTS
Lowfat dairy products (those containing no more than 2 percent butterfat) and skim milk products are allowed. For persons who need to lose weight, the skim milk dairy products are lower in saturated fat and calories than the low fat varieties. Cheese, a popular food, is difficult for people to give up; however, if carefully selected, cheese can be included in the low cholesterol diet. Varieties made with skim milk or polyunsaturated fat are available on the retail market.

BREAD AND CEREAL PRODUCTS
Foods in this group are often termed "fattening," but this label is not really warranted. It is the spread (honey, preserves, gravy, or butter) which doubles the calories and needs to be limited.

FRUITS AND VEGETABLES
Four or more servings daily are recommended from this group, with at least one that is a good source of vitamin C and one a good source of vitamin A.

FATS
Fat is the most concentrated source of calories and should be selected carefully. This food group affects the level of cholesterol in the blood. Large amounts of saturated fat tend to increase plasma cholesterol, polyunsaturated fat helps reduce it, and monosaturated fat has no effect on it.

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